THE EXCHANGE
Pest Control Circular

R. S. WOGLUM
Entomologist

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CALIFORNIA FRUIT GROWERS EXCHANGE
in the interest of its members

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FUMIGATION ON NIGHTS OF FREEZING WEATHER IS HAZARDOUS

We are now approaching the time of year when freezing temperatures may be experienced. Records of past experience show that fumigation on nights when orchard temperatures drop below the freezing point of citrus fruit (28 to 30° F.) is hazardous, even when the minimum may occur several hours following the fumigation.

In recent years several cases of rather severe fruit damage from fumigation on nights of subfreezing temperatures have occurred during November and December. This damage amounted to "scalding" or burning of fruit with subsequent drop, which in some cases was excessive, particularly on the last rows of the night's run. Valencias were most severely affected. It appears that the susceptibility to this injury is correlated more or less with the maturity and hardiness of the tree and fruit, which accounts for the more severe damage from fumigation during periods of subfreezing temperatures in November and early December than later in the winter.

Therefore, it is important that fumigators watch the minimum temperature forecasts closely during this period and, on nights of forecast temperatures below 30° F. for a particular district, not fumigate in that area, or stop work at 40° F., in order to allow several hours between work stoppage and the night's minimum. On nights of forecast minimums of 26° F. or below, fumigation should not be started at all.

As is well known, the U.S. Fruit Frost Service, with headquarters at Pomona, forecasts minimum temperatures for the citrus belt beginning on November 15. These forecasts will be released each night at 9:00 p.m. (Daylight Saving) over Radio Station KFI. Prior information may be obtained by telephone from the Fruit Frost Service, Pomona, or from district agents whose names and telephone numbers are given below:

Pomona Office	*Lycoming 22501*
Harry B. Hansen	*Chico 17-W3*
Leland H. Johnson	*Corona 1080*
Claude A. Cole	*Covina 632-83*
R. Roy Simpson	*El Centro, County Court House*
Charles C. Allen	*Lindsay (Ask operator Lindsay)*
Edwin M. Legg	*Redlands 6898*
Wayne E. Harman	*San Diego - Hilldale 43271*
Wm. J. Rogers	*Santa Paula 759-Y1*
Roy J. Rogers	*Upland. Call Pomona, Lycoming 22501*
Harold A. Rathbone	*Whittier 844-66*

NOTE: *It is well to avoid oil sprays prior to severe freezing weather.*

BROWN ROT CONTROL

The next two months is the period when skirt spraying of trees, both orange and lemon, is done for brown rot prevention. Bordeaux mixture of copper sulfate and hydrated lime has for many years been the standard treatment for brown rot control. In recent years there has been considerable damage to citrus trees in Los Angeles, western San Bernardino and Orange counties, in connection with the use of copper, particularly at the higher dosages. The following formula which is recommended by the Citrus Experiment Station, *or its commercial equivalent,* has been found to be quite effective, relatively safe and one that may be fumigated over: 5 pounds zinc sulfate, 1 pound copper sulfate and 4 pounds hydrated lime to 100 gallons of water. (1 lb. copper sulfate contains 1/4 lb. metallic copper.) For a long time this has been the preferred brown rot formula to be used in fumigated orchards. In view of its general safety angle it is also the recommended formula for general use in areas subject to copper damage. Fumigation of citrus trees, especially of oranges, which have been sprayed within a few months with strong Bordeaux mixture, is apt to cause severe damage. In the above formula the addition of zinc sulfate has been observed to lesson the tendency toward fumigation damage. There are several brands of zinc-copper-lime mixtures marketed commercially in powder form which are extensively used. Care should be taken to use them in amounts to give not less than 1/4 pound metallic copper equivalent per 100 gallons.

In San Diego, Ventura, Santa Barbara and eastern San Bernardino counties, and parts of Riverside County, past experience has shown little or no damage from brown rot Bordeaux formulas containing somewhat higher dosages of copper when used *only in orchards not to be fumigated.* The one generally used in these areas and recommended by the Citrus Experiment Station consists of 3 pounds copper sulfate and 3 pounds hydrated lime to 100 gallons water. Commercial package Bordeaux of equivalent copper content is also extensively used, being available as a two-package or single-package product.

In brown rot control work the skirts of the trees should be sprayed three or four feet high, paying particular attention to thorough coverage of the fruit. Treat the inside as well as the outside, covering the tree trunk thoroughly. Four to six gallons are adequate. Do not disturb the soil after spraying.

BROWN ROT PREVENTION YOUNG TREES

At this time of year it is good practise in the case of young trees, especially those on heavy soil, to pull back the soil around the bud union and paint with a copper-Bordeaux paste for brown rot prevention. Leave exposed during the winter. For this some will prefer Bordeaux paste consisting of one part copper sulfate and one part lime made into a thin paste with water. If fumigation is considered, use zinc-copper-lime in 5-1-4 proportion or commercial equivalent.

SEPTORIA ON GRAPEFRUIT

Septoria, a fungus disease, frequently causes spotting and cullage of grapefruit in the orchards of central and southern California, exclusive of the desert areas. This damage is especially pronounced in seasons of heavy and prolonged rainfall. The preferred treatment is to spray in late fall or early winter with zinc-copper Bordeaux mixture. This mixture should be used at the rate of 5 pounds zinc sulfate, 1 pound copper sulfate and 4 pounds hydrated lime, or its commercial equivalent, to 100 gallons of water Spray over the entire tree. Thorough coverage inside as well as outside the tree is very important for satisfactory control.

RED SCALE DURING NOVEMBER

In most districts there remains considerable acreage in need of red scale treatment. At least an annual treatment is usually required to maintain red scale under satisfactory control. In the case of spraying, it is very important to make thorough coverage, paying particular attention to top coverage where the scale is often most severe.

ORANGES - During the next few months, fumigation is the preferred treatment for red scale control on oranges in most areas and, where usable, dosages of 20 to 24 cc. should be applied. In some coastal areas, trees are still too tender for these dosages and it may be several weeks before work gets under way. It should always be borne in mind that most fumigated orchards will require additional treatment for spider.

The main place for spraying of oranges during November is in the case of valencias. As a general proposition, light medium oil, emulsions 2% or emulsibles 1-3/4%, should be used. However, in areas most subject to drying fall winds which are conducive to rapid disappearance of oil, a somewhat heavier oil, as medium, is often required to gain control. Very scaly orchards should also be winter fumigated. The color of navels is starting to break and it is now too late for the use of oil on this variety except in emergencies. Oil used this late on navels usually retards maturity and causes serious interference with obtaining satisfactory coloration in the packing house.

LEMONS - Lemon orchards to be treated for red scale during November should be sprayed with heavy medium or medium oil at regular dosages. Picks should be made close prior to spraying. Heavy oil is used along the coast in San Diego County. This oil spray program will also handle red spider and bud mite. Orchards severely infested with red scale should be double treated, applying the oil spray now and following later in the winter or spring with fumigation. A second oil spray in the spring may be substituted where bud mite is a problem.

CONTROL OF CITRUS RUST MITE PARTICULARLY ON ORANGES

Citrus rust mite, also called silver mite when it attacks lemons, is not as active at present as during the past two years in areas where it has become well established. However, new infestations have recently been found south of the river in Ventura County and in Santa Barbara County.

This mite, microscopic in size, builds up very rapidly, working mostly on immature fruit and destroying its commercial value in a very short time. Oranges take on a brown or rust color and lemons a silver color; the rind becomes hard and leathery. The presence of mites in an orchard is very easily detected by the appearance of the fruit at this season of the year.

The regular oil spray program, as practised by most growers at this season of the year, will give at best only temporary control of rust mite and in many cases is not applied until most of the damage to the fruit has taken place.

Sulfur, used either as a dust or spray, has long been recognized as giving good control of rust mite but there are several drawbacks to its use during the summer months when the mites do the most damage. Sulfur often causes burning of fruit and foliage during periods of extreme temperature or, if applied within a few weeks of oil spray, will often cause damage; also, it is irritating to pickers when used during the season of fruit removal.

Experience has shown that a program of two sulfur dusts gives very satisfactory control. The first dust, consisting of approximately 90 pounds per acre, should go on some time during the next two months as soon as danger from hot weather is over, and the second dust of 40 to 50 pounds per acre during the early spring after the rains are over and before hot weather sets in.

A spray of 3 pounds of wettable sulfur to 100 gallons may be substituted for the dust. This will give satisfactory control but is more expensive.

A NEW SPIDER MITE, *Tetranychus lewisi*, IN VENTURA COUNTY

A new spider mite was found on orange fruit at Corona by H. C. Lewis in 1943 and was described by E. A. MacGregor. At the time its damage did not appear to be important, merely causing slight feeding injury to an occasional stick-out fruit. Presence of this mite was lost sight of until the spring of 1948, when it appeared in Ventura County. During the past six months it has been reported from all parts of Ventura County. In some valencia orchards west of Santa Paula, it has caused considerable commercial damage this season.

All complaints of damage in Ventura County to date have been confined to mature valencia fruit although the original infestation in Riverside County was taken from navel oranges. The damage amounts to discoloration of the peel and, where the infestation is severe, desiccation usually follows. Heavily infested orchards, where the fruit has remained on the trees late in the season, have shown considerable reduction of grade and cullage in the packing house. The spider mite produces webbing in which it works and which collects much dust. The most severe damage appears to be on trees or limbs where the foliage is sparse, or on outside fruit. It works on all sides of the tree.

The appearance of this mite has been so recent that control measures have not as yet been determined.

CONTROL OF BLACK AND PURPLE SCALES

The fall hatch of *double brooded black scale* is now far enough advanced for treatment in most orchards. At this season of the year, it is not necessary to have a complete emergence of the young before treatment. The oil will penetrate under the shells of the mature scale if hatching has started and destroy the eggs and young crawlers and, since the oil remains on the tree for a longer period at this time of the year than in the summer, more young scales are prevented from settling. Light medium oil, emulsions 1-2/3%, or emulsibles 1-1/2%, are recommended.

Single brooded black scale is still small enough to be controlled with oil spray during November.

Purple scale is now in good condition for treatment, as most of the scale is still in the immature stages, and a thorough application of a light medium oil should give a more satisfactory control than winter fumigation. A combination of both treatments may be necessary in the case of severe infestations to secure a clean-up.

FALL SPRAYING IN CENTRAL CALIFORNIA

Green leafhoppers began migrating into citrus groves late in October and by the end of the month some injured fruit could be found. While hoppers have not been very important for several years, this early appearance in numbers might indicate they are on the increase again. It is impossible to tell in the fall just how serious these influxes of leafhoppers will be. Usually further movement of hoppers is to be expected from the cultivated field crops as they mature and dry up. Growers with orchards subject in the past to damage should be on the watch for leafhoppers and be prepared to spray.

A combination treatment for leafhopper, Septoria, brown rot and mottleleaf control is zinc sulfate 5 pounds, copper sulfate 1 pound, hydrated lime 15 to 20 pounds, with 1/2 to 3/4 pound of casein spreader per 100 gallons. Where leafhoppers are not a consideration, the lime in the above formula may be reduced to 4 pounds per 100 gallons. Usually only an outside coverage is required, although where brown rot control is desired a thorough coverage of tree skirts is necessary. For Septoria control on grapefruit, thorough coverage throughout the tree is required. Considerable spraying has been done in the last month.